

Specification 5100-105d  
August 1997  
Superseding  
Specification 5100-105c  
August 1989

**UNITED STATES DEPARTMENT OF AGRICULTURE**  
**FOREST SERVICE**  
**SPECIFICATION FOR**  
**STRAINER, SUCTION HOSE**

1. SCOPE.

1.1. Scope. The strainers described in this specification are designed for use with Forest Service suction hose in wildland firefighting operations. This strainer is designed to prevent small debris and abrasive material from entering the suction hose line while drafting from streams and lakes; thereby preventing damage to the pump or clogging of the discharge nozzle. Thread series designations are 1 inch 11-1/2 NPSH, 1-1/2 inch 9 NH and 2-1/2 inch 7-1/2 NH. The strainer has been designed to perform satisfactorily in any water source and position. The strainer is a sturdy construction to withstand rough handling and impact onto a hard surface.

2. APPLICABLE DOCUMENTS.

2.1. Government Documents. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals (see 6.2).

USDA Forest Service Standard

5100-190 - Threads, Gaskets, Rocker Lugs, Connections and Fittings, Fire Hose

Copies of USDA Forest Service Specifications and Standards are available from USDA Forest Service, San Dimas Technology and Development Center, 444 East Bonita Avenue, San Dimas, CA 91773-3198.

2.2. Non-Government Publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals.

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Beneficial comments, recommendations, additions, deletions and any pertinent data that may be used in improving this document should be addressed to: USDA Forest Service, San Dimas Technology and Development Center, 444 East Bonita Avenue, San Dimas, CA 91773-3198 by using the Specification Comment Sheet at the end of this document or by letter.

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American National Standards Institute Inc. (ANSI)/American Society For Quality Control (ASQC)

Z 1.4 - Sampling Procedures and Tables for Inspection by Attributes.

Address requests for copies to the American National Standards Institute Inc., 11 West 42nd Street, New York, NY 10036.

American Society for Testing and Materials (ASTM)

B 26 - Aluminum-Alloy Sand Castings

E 380 - Practice for Use of the International System of Units

Address requests for copies to American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

Non-Government standards and other publications normally are available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.

2.3. Order of Precedence. In the event of conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS.

3.1. First Article. Unless otherwise specified, first article inspection shall be performed on a product sample(s) in accordance with 4.4.3.

3.2. Construction. Strainer configuration shall be as shown in Figure 1. Figure 1 is provided for information only and is not intended to designate a particular design or manufacturer.

3.2.1. Strainer. The strainer shall be manufactured in three different inlet sizes, with thread series designations of 1 inch 11-1/2 NPSH, 1-1/2 inch 9 NH and 2-1/2 inch 7-1/2 NH. The strainer shall be cast in two sections with an internal threaded end in one section and openings for water in the other section. The parts shall be mated with a minimum of 4 machine screws in the 1 inch 11-1/2 NPSH and 1-1/2 inch 9 NH models and 6 machine screws in the 2-1/2 inch 7-1/2 NH model.

3.2.2. Screen. A removable screen and screen supports with 16 mesh of 25 or 26 gage wire, shall be assembled between the two sections. 100 percent of the water stream shall go through the screen. The screen must have support to prevent collapse at peak flows.

3.2.3. Screen Support. The screen shall have support provided by 2 metal rods of 0.30 inch (7.62 mm) diameter to prevent collapse at peak flows.

3.2.4. Ribs. There shall be a minimum of 4 ribs for the 1 inch 11-1/2 NPSH strainer, and a minimum of 6 ribs for the 1-1/2 inch 9 NH and 2-1/2 inch 7-1/2 NH strainers.

3.2.5. Gasket Recess. A gasket recess shall be included and a gasket shall be installed in each internal threaded section.

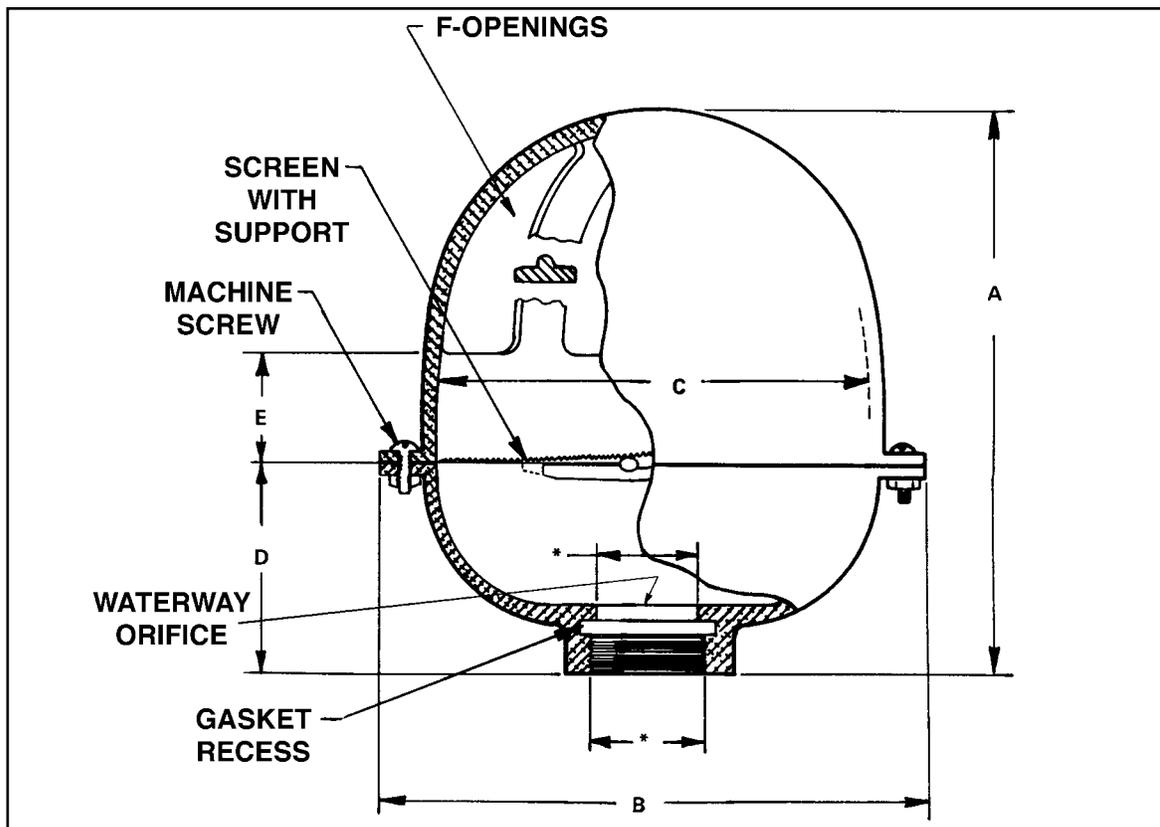


Figure 1. Suction hose strainer configuration.

3.2.6. Waterway Orifice. The waterway edge on the inlet adjacent to the strainer threads shall have a minimum inlet external radius as indicated below, to reduce the sharp edged orifice. See Figure 1.

- a. 1 inch 11-1/2 NPSH - a minimum radius of 15 percent of the diameter of the waterway
- b. 1-1/2 inch 9 NH - a minimum radius of 15 percent of the diameter of the waterway
- c. 2-1/2 inch 7-1/2 NH - a minimum radius of 15 percent of the diameter of the waterway

3.3. Materials. Where more than one type of material is used in various components there shall be no incompatibility between materials which may cause corrosion.

3.3.1. Strainer Body. The two sections of the strainer body shall be cast aluminum alloy, 356-T6, in accordance with ASTM B 26.

3.3.2. Filter Screen. The filter screen material shall be a 16 mesh screen of 25 or 26 gage stainless steel wire, appropriate for a water environment.

3.3.3. Gasket Material. Gasket material physical properties shall meet the requirements of USDA Forest Service Standard 5100-190.

3.3.4. Recoverable Materials. The contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR), provided all performance requirements of this specification are met.

### 3.4. Weights and Dimensions.

3.4.1. Dimensions. Dimensions shall be as shown in Figure 1 and Table 1.

Table 1. Suction Hose Strainer Dimensions

Thread Series Designation	-A- inch (mm)	-B- inch (mm)	-C- inch (mm)	-D- inch (mm)	-E- inch (mm)
1 inch 11-1/2 NPSH	5.50 +/-0.25 (139.70 +/- 6.45)	5.38 +/-0.13 (136.65 +/- 3.30)	3.87 +/-0.13 (98.29 +/- 3.30)	2.00 +/- .013 (50.80 +/- 3.30)	0.75 +/- 0.06 (19.05 +/-1.52)
1-1/2 inch 9 NH	7.63 +/-0.25 (193.80 +/- 6.35)	7.63 +/- 0.13 (193.80 +/- 3.30)	6.00 +/- 0.13 (152.40 +/- 3.30)	2.75 +/- 0.13 (69.85 +/- 3.30)	1.50 +/- 0.06 (38.10 +/- 0.16)
2-1/2 inch 7-1/2 NH	10.31 +/- 0.25 (261.87 +/- 6.35)	9.58 +/- 0.13 (243.33 +/- 3.30)	7.75 +/- 0.13 (196.85 +/- 3.30)	3.88 +/- 0.13 (98.22 +/- 3.30)	2.00 +/-0.06 (50.80 +/- 1.52)

3.4.2. Weight. Weight shall be as indicated in Table 2.

Table 2. Suction Hose Strainer Maximum Weight

Thread Series Designation	Maximum Weight	
	lb	(kg)
1 inch 11-1/2 NPSH	1.38	(0.63)
1-1/2 inch 9 NH	2.82	(1.28)
2-1/2 inch 7 -1/2 NH	5.00	(2.27)

3.4.3. Dimensional Tolerance. Unless otherwise noted, the following tolerances apply: one place (x.x) +/- 0.1 inch (2.5 mm); two places (x.xx) +/- 0.01 inch (0.25 mm) and three places (x.xxx) +/- 0.010 inch (0.254 mm).

3.5. Workmanship. Workmanship shall be equal to the best commercial practices consistent with the highest engineering standards in the industry and shall be free from any defect which may impair serviceability or detract from the product's appearance.

3.5.1. Symmetry. All metal part sections shall be symmetrical and concentric to 0.030 inch (0.762 mm).

3.5.2. Cast Components. Cast parts shall be fine-grained, free from blowholes, pinholes, pits, porosity, hard spots, shrinkage, cracks or other defects

3.6. Threads, Waterways, Gaskets, and Gasket Recesses. All threads, waterways, gaskets and gasket recesses shall be in accordance with USDA Forest Service Standard 5100-190.

3.7. Marking. Markings shall be in accordance with USDA Forest Service Standard 5100-190.

3.8. Surface Treatment. The aluminum alloy threaded surfaces, shall be hardcoated in accordance with USDA Forest Service Standard 5100-190.

3.9. Surface Finish. The finish for all surfaces, to include threaded surfaces, shall be in accordance with USDA Forest Service Standard 5100-190.

3.10. Performance.

3.10.1. Impact Test. When tested in accordance with 4.6.1, there shall be no damage or separation of parts. There shall not be any dents, fractures, or cracks in the body of the strainer, or permanent distending, bending, or damage to the screen and its supports.

3.10.2. Metric Products. Metric dimensions are provided for information only, inch-pound units shall be the required units of measure for this specification. Thread series designation are indicated as 1 inch 11-1/2 NPSH, 1-1/2 inch 9 NH and 2-1/2 inch 7-1/2 NH. Since these are thread series designation, not an indication of a specific dimension, the metric equivalent is not given. Products manufactured to metric dimensions shall be considered on an equal basis with those manufactured using inch-pound units, provided they fall within the tolerances specified using conversion tables contained in the latest revision of ASTM E 380, and all other requirements of this specification are met.

#### 4. INSPECTION, SAMPLING AND TEST PROCEDURES.

4.1. General Inspection and Tests. Unless otherwise specified in the contract or purchase order, the contractor is responsible for performance of all inspection requirements prior to submission for Government acceptance inspection and tests. The contractor may utilize their own facilities or any commercial laboratory acceptable to the Government. Inspection records of the examination and tests shall be kept complete and available to the Government.

4.1.1. Inspection and Test Site. The Government shall conduct lot acceptance inspection and tests to determine compliance with the specification. If lot acceptance and tests are conducted at locations other than the manufacturing facilities, the contracting officer shall specify location and arrangements. In the case of on-site inspections at the contractor's facility, the contractor shall furnish the inspector all reasonable facilities for their work. During any inspection, the inspector may take from the lot one or more samples and submit them to an independent test laboratory approved by the Government or to a Government test facility for inspection and tests.

4.1.2. Testing With Referenced Documents. The contractor is responsible for ensuring that components and materials used were manufactured, examined and tested in accordance with referenced specifications and standards. The Government reserves the right to perform any of the inspections or tests set forth in this section where such action is deemed necessary to assure supplies and services conform to prescribed requirements.

4.2. Responsibility for Compliance. All items shall meet all requirements of sections 3 and 4. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in this specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.3. Sampling for Inspection. When inspection is performed, sampling shall be in accordance with ANSI/ASQC Z 1.4.

4.3.1. Lot. All strainers of one size presented together in one delivery shall be considered a lot for the purpose of inspection. A sample unit shall be one strainer.

4.3.2. Sampling for Visual and Dimensional Examination. Sampling for visual and dimensional examination shall be S-3, with an Acceptable Quality Level (AQL) of 2.5 percent.

4.3.3. Sampling for Lot Acceptance Tests. Sampling for lot acceptance testing shall be S-3, with an AQL of 2.5 percent defective.

#### 4.4. Inspection and Tests.

4.4.1. Visual and Dimensional Examination. When selected in accordance with 4.3.2, each strainer shall be visually and dimensionally examined to determine conformance with this specification. Visual or dimensional defects shall be classified as major or minor. A defect not listed in Table 3 shall be classified as a minor defect. If the number of defects in any sample exceeds the indicated AQL, the lot shall be rejected.

Table 3. Major and Minor Defects

Defect	Classification	
	Major	Minor
1. Strainer assembly not complete.	X	
2. Hardcoating not as required.	X	
3. Thread dimensions not within specified dimensions and failure to pass gage tests.	X	
4. Dimensions and weight not as required.	X	
5. Material not as required.	X	
6. Workmanship and finish not as required.	X	
7. Threads not smooth and not free of imperfections.		X
8. Illegible or improper marking.		X

4.4.2. Lot Acceptance Tests. Each of the samples selected in accordance with 4.3.3, shall be tested in accordance with 4.6, to determine conformance with requirements of this specification.

4.4.3. First Article Inspection. Unless otherwise specified (see 6.2), the first article sample(s) indicated in 3.1, shall be inspected as specified in 4.4.1 and 4.6. All inspection and testing of the first article sample(s) shall stop upon a single failure and the sample(s) rejected. The contractor shall be informed as to the nature of the failure, but the Government shall not be obligated to continue testing a defective item, once it is known to be defective or when it is considered in the best interest of the Government.

4.4.4. Quality Conformance Inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with ANSI/ASQC Z 1.4. The inspection level and AQL shall be as specified in 4.3.3.

4.5. Certificate of Conformance. A Certificate of Conformance shall meet the requirements of USDA Forest Service Standard 5100-190. Where certificates of conformance are required, the Government reserves the right to verify test any such items to determine the validity of certification. These certificates shall be based on the testing of component materials and may be performed by the component material supplier. The contractor shall provide certificates of conformance for all materials used in 3.3.1, 3.3.2, 3.3.3 and 3.8 (see 4.5.2, 4.5.3, 4.5.4 and 4.5.5 ).

4.5.1. Certificates of Conformance in Lieu of Testing. Unless otherwise specified, certificates of conformance may be acceptable in lieu of testing end items.

4.5.2. Strainer Body. As required by 3.3.1, strainer material shall meet the indicated material physical property requirement listed, when tested to defined test method.

4.5.3. Filter Screen. As required by 3.3.2, the screen material shall meet the indicated material physical property requirement listed.

4.5.4. Gasket Material Test. As required by 3.3.3, gasket material physical properties material shall meet the indicated material physical property requirement listed, when tested to defined test method.

4.5.5. Surface Treatment. As required by 3.8, aluminum alloy surfaces, to include threaded surfaces, material shall meet the indicated material physical property requirement listed, when tested to defined test method.

4.6. Performance Testing. Samples shall be subjected to the following tests to determine if the samples meet the requirements of this specification.

4.6.1. Impact Test. As required by 3.10.1, the suction hose strainer shall be tested for impact resistance. It shall be dropped in a free fall from a height of 4.0 foot +/- 2.0 inches (1.22 m +/- 51 mm) to a flat concrete surface. The strainer shall be dropped three consecutive times from three different positions to impact at three different points. The strainer shall be examined after the third drop for damage or separation of parts.

## 5. PACKAGING, PACKING AND MARKING

5.1. Packaging, Packing and Marking. The packaging, packing and marking shall be as specified in the contract or order.

## 6. NOTES.

6.1. Intended Use. The strainers described in this specification are designed to be used on Forest Service suction hose in wildland firefighting operations. This strainer is designed to prevent small debris and abrasive material from entering the suction hose line while drafting from streams and lakes; thereby preventing damage to the pump or clogging of the discharge nozzle.

6.2. Acquisition Requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. If a first article sampling and inspection is not required (see 3.1, 4.4.3, and 6.3).
- c. Thread series designation of strainer required.
- d. If certificates of conformance are acceptable in lieu of lot by lot testing (see 4.4.2 and 4.5).
- e. Packaging, packing and marking (see 5.1).
- f. Date of the invitation for bids or request for proposals (see 2.1).

6.3. First Article. When a first article sample(s) is required, it shall be inspected and approved in accordance with the First Article clauses set forth in the solicitation. Specific instructions shall be included regarding arrangements for selection, inspection, and approval of the first article sample(s).

6.4. Notice. When Government drawings, specifications, or other data are used for any purpose other than in connection with a related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever.

6.5. Preparing Activity. USDA Forest Service, San Dimas Technology and Development Center, 444 East Bonita Avenue, San Dimas, CA 91773-3198.





**United States Department of Agriculture, Forest Service  
Standardization Document Improvement Proposal**

**Instructions:** This form is provided to solicit beneficial comments which may improve this document and enhance its use. Contractors, government activities, manufacturers, vendors, or other prospective users of this document are invited to submit comments to the USDA Forest Service, San Dimas Technology and Development Center, 444 East Bonita Avenue, San Dimas, California 91773-3198. Attach any pertinent data which may be used in improving this document. If there is additional documentation, attach it to the form and place both in an envelope addressed to the preparing activity. A response will be provided when a name and address are included.

**Note:** This form shall not be used to submit request for waivers, deviation, or for clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

Standard Number and Title: **Specification 5100-105d, Strainer, Suction Hose.**

Name of Organization and Address:

\_\_\_\_\_ Vendor                      \_\_\_\_\_ User                      \_\_\_\_\_ Manufacturer

1. \_\_\_\_\_ Has any part of this document created problems or required interpretation in procurement use?  
       \_\_\_\_\_ Is any part of this document too rigid, restrictive, loose or ambiguous? Please explain below.

Give paragraph number and wording:

Recommended change(s):

Reason for recommended change(s):

Remarks:

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San Dimas Technology & Development Center  
ATTN: Water Handling Project Leader  
444 East Bonita Avenue  
San Dimas, California 91773-3198

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